

A New Species of North American *Scotolinx* with Taxonomic Notes on the Genus

(Hymenoptera: Eulophidae)

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Ashmead (1904) described *Scotolinx* in a key to the genera of Elachertini, but he did not give a description of the type-species, *S. gallicola* Ashmead. This paper describes that species. Ishii (1953) described *Scotolinx phyllocnistis* based on females reared from *Phyllocnistis citrella* Stainton (Lepidoptera) taken at Nagasaki, Japan. Subba Rao and Ramamani (1966) described *S. quadristriata* based on material reared from the same host species on citrus in India. Boucek (pers. comm.) is transferring *quadristriata* to another genus and Kamijo is transferring *phyllocnistis* to still another genus; these species will not be considered in this paper.

A large series of specimens representing an underscribed species of *Scotolinx* was sent to me by Mr. Jack Hall, Division of Biological Control, University of California, Riverside. Description of this species also provides an opportunity to characterize the genus more properly.

Scotolinx Ashmead

Scotolinx Ashmead, 1904. Mem. Carnegie Mus. 1 (4): 354, 355. Type-species: *Scotolinx gallicola* Ashmead. Original Designation. *Scotolinx* Girault, 1916. Mem. Queensland Mus. 5: 216. Type-species: *Scotolinx gallicola* Girault. Original Designation. (Redescription of Ashmead's type-material.)

Female: Head wider than tall; compound eye with minute, pale setae; clypeal margin weakly bilobed; mandible bidentate with a broad truncation which may be finely serrated; maxillary palpus 2-segmented; labial palpus 1-segmented; antennal formula 1,1,2,2,3; torulus inserted above imaginary line extending between ventral margins of compound eyes. Pronotum not shouldered, sloping anteriorly, collar not margined; scutellum with 2 pairs of large setae and 1 pair of discoid sensilla; meson of metanotum not strongly tumid; propodeum without median carina. Fore wing with costal cell and basal cell setose; submarginal vein not projecting strongly into basal cell; stigma bulbous; ventral surface of fore wing with some setae projecting perpendicular to wing surface. Hind wing with 3 hamuli.

Male: With the characters of the female, but the body has metallic coloration and the antennal formula is 1,1,2,2,3 or 1,1,2,3,2.

Scotolinx is related to *Pseudolynx* Girault and *Aulogymnus* Foerster (= *Olynx* Foerster). These genera represent a continuum in a morphological transformation series, and the characters that may be used to differentiate them are mostly qualitative. A strong argument can be made for synonymizing them. However, I do not have adequate evidence to synonymize them. Table 1 gives the characters which may be used to distinguish these genera.

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Table 1. Characters used to differentiate *Scotolinx*, *Aulogymnus*, and *Pseudolynx*.

Taxon	Female antenna	Propodeal carina	Stigma	Basal cell	Metanotal meson	Pronotum	Sexual dichromism
<i>Scotolinx</i>	1,1,2,2,3	absent	bulbous	setose	not tumid	not shouldered	yes
<i>Aulogymnus</i>	1,1,2,3,2	present	parallel-sided	asetose	not tumid	not shouldered	no
<i>Pseudolynx</i>	1,1,2,2,3	absent (2 spp.) evanescent (1 sp.)	parallel-sided	setose	tumid	shouldered	?

Girault (1915) created *Cirrospilopsis* for 3 Australian species which I have not seen. The generic name was preoccupied by *Cirrospilopsis* Brethes, 1913 and therefore Gahan and Fagan (1923) proposed *Giraultia* for the species formerly included in *Cirrospilopsis* Girault.

From the original characterization of *Cirrospilopsis* Girault it is not possible to identify that genus. Girault (1916, 1917a, 1917b) placed 3 North American species in the genus and these were retained in *Giraultia* by Muesebeck et al. (1951). Each of the North American species is known only from the few specimens used in the original descriptions and the species have not been recovered elsewhere.

Judging from the descriptions of the Australian species and the type-material of the North American species, *Giraultia* is a loose assemblage of species because there is extensive morphological variation.

Scotolinx sapientia (Girault), **New Combination**, was characterized by Girault (1917b) as having tridentate mandibles but examination of the head of a slide mounted type-specimen reveals that the mandible is bidentate with a finely serrated truncation. This, combined with the noncarinate propodeum, antennal formula, setose basal cell of the fore wing, and non-shouldered pronotum refers *sapientia* to *Scotolinx* as that genus is understood here. The remaining 2 species of *Giraultia* from North America do not appear congeneric but I hesitate to place them without additional material, further study of related genera, and examination of the Australian species of *Giraultia*.

I designate as **Lectotype** of *S. sapientia* a point-mounted female whose head, wings, and antennae are mounted on a slide. (USNM type no. 20217.)

Scotolinx gallicola Ashmead

Female: 1.68mm long. Body pale yellow except anteromedial area of pronotum, posterior margin of gastral terga 2-5, and antennal flagellum dusky. Legs concolorous with body. Fore wing and hind wing hyaline. Dark, conspicuous setae on vertex and head surface posterior to compound eye extending ventrally to genal suture. Mandible (Fig. 1) with truncation bearing microstriae. Antenna (Fig. 2) with funicular segments as long as wide; club compact, maximal width greater than funicular segment maximal width.

Mesosomal chaetotaxy: Pronotum setose along posterior margin and lateral region; mesoscutum with 2 pairs of small setae medially; scapula with 2 large setae and several

small setae; metanotum aetose; axilla with 1 large seta; propodeal callus with several small, pale setae anteriorly, 2 large, dark setae posteriorly. Costal cell of fore wing with a line of setae along distal half of cell anterior-margin, a line of setae extending the length of the cell halfway between its anterior and posterior margins. Gastral terga 1-4 setose laterally, remaining terga uniformly setose.

Male: 1.55mm long. Similar to the female in habitus and chaetotaxy; differing in that the vertex is dusky, medial portion of the pronotum, mesoscutum, scutellum, axilla, metanotum, and propodeum are metallic dark green. Gaster reddish brown.

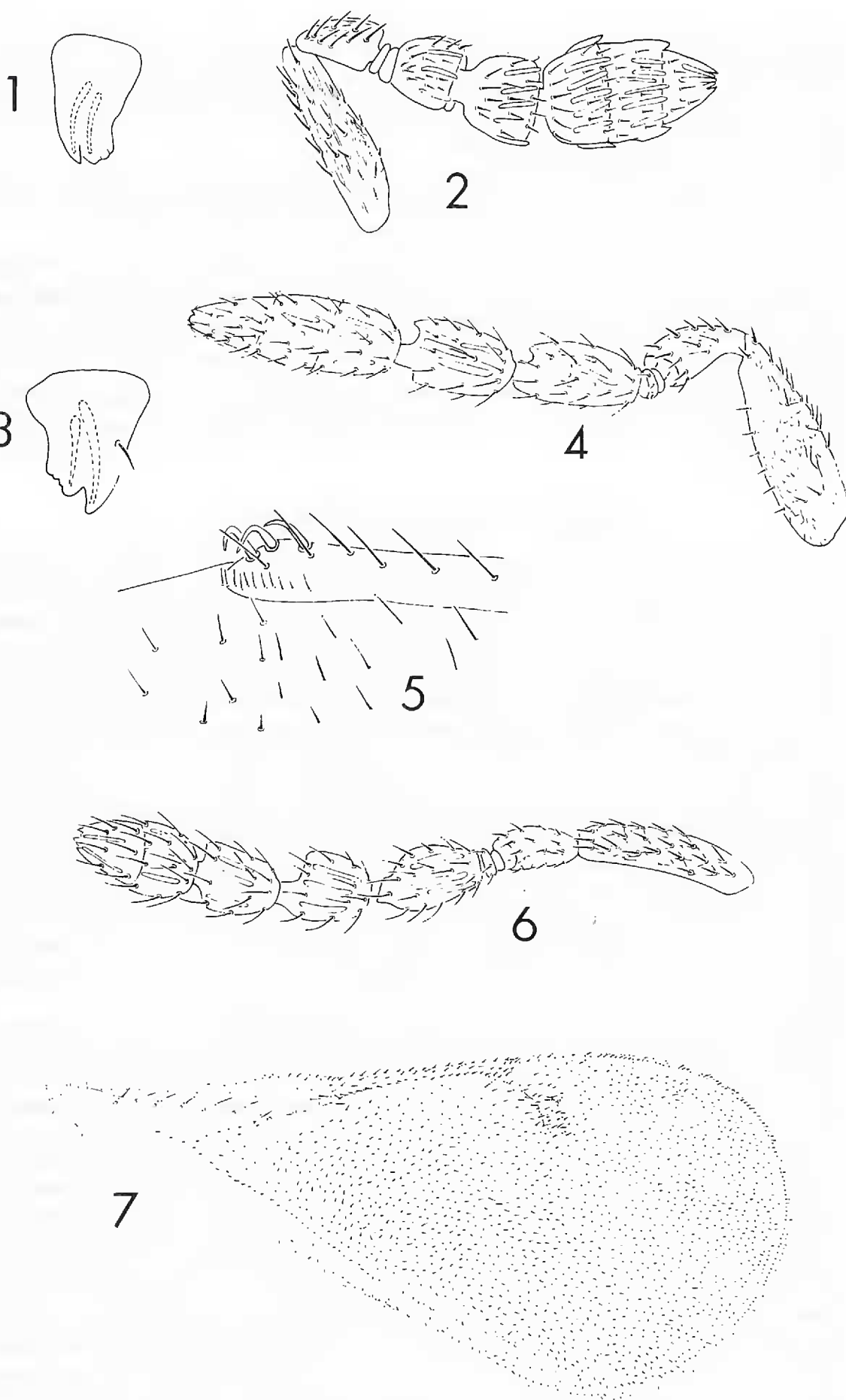
Redescribed from 4 males, 2 females, and parts of a third female. All specimens are in the USNM collection. I designate as **Lectotype** a female mounted on a card with 3 males; I have drawn an arrow to the female. Labels on the pin read: "78", "liverpool galls *M. lithifolia*," "USNM type no. 12793," and "*Scotolinx gallicola* ♀♂ type Ashm."

I noted little variation in the type-series, probably because the series is small.

***Scotolinx californica*, new species**

Female: 2.28mm long. Head yellow except the following darkened areas: hypostomal bridge; transverse stripe above occiput extending between compound eyes; spot between torulus and compound eye; genal sulcus; transverse, interrupted stripe extending between lower margins of compound eye. Mesosoma yellow except dark anteromedial portion of pronotum, notaulix, longitudinal stripe on lateral portion of mesoscutellum, meson, and anteriolateral portions of metanotum. Propodeum metallic dark green. Gaster uniformly dark brown. Ventral surface of antennal scape pale, dorsal surface and remaining segments dusky. Legs pale except dusky hind coxa, trochanter, and femur. Fore wing (Fig. 7) hyaline with dusky area adjacent to stigmal vein and junction of submarginal and marginal veins; fainter duskiness along apical wing-margin. Hind wing hyaline. Head with uniformly reticulate sculpture. Anterior and posterior surfaces adjacent to compound eye with a more dense vestiture of dark setae. Compound eye with small, pale, fine, sparsely distributed setae. Toruli separated by slightly more than width of a torulus. Mandible (Fig. 3) with 2 well-defined teeth and a broad truncation that is subdivided into at least 3 microscopic teeth. Antennal scape and pedicel (Fig. 4) setose, with bold, reticulate striae that connect setal sockets; second annulus setose; first funicular segment slightly longer than second; rhinaria on both funiculars and club.

Mesosoma with uniformly reticulate striae except posterolateral area of metanotum. Chaetotaxy: pronotum with small setae anterolaterally, a line of large setae along posterior margin; mesoscutum with 3 pairs of large setae, 1 pair of small setae; scapula with a large medial pair and 4 small lateral pairs of setae; propodeal callus with moderately abundant vestiture of long thin, pale setae. Gastral terga with lightly incised striae; terga 1 and 2 with a few setae laterally; tergum 3 with lateral setae and a line of setae extending along posterior tergal margin; tergum 4 with posterior half setose; terga 5-7 densely and uniformly setose. Sterna 1-6 with lightly incised reticulate sculpture, aetose; subgenital plate smooth, with a few setae basally, becoming striated and densely setose apically; basal half of gonocoxite with reticulate sculpture, aetose, distal half smooth and with 2 longitudinal lines of setae. Gonostylus moderately setose. Ovipositor not strongly exerted, 2.48 times longer than hind tibia; gonostylus 0.61 times as long as hind tibia. Fore wing costal cell with 2 lines of setae, anterior line along cell margin on distal half of cell, posterior line anterior to venation and extending length of costal cell. Dorsomedial surface of submarginal vein with a row of setae; marginal and postmarginal veins densely setose; stigma sparsely setose. Dorsal surface of wing densely setose; speculum weakly developed; ventral surface of wing with 2 rows of long setae perpendicular to wing surface and parallel to marginal vein; marginal fringe short; postmarginal vein not well defined, about 1.5 times longer than stigmal vein; submarginal vein 1.4 times longer than marginal vein. Hind wing hyaline; submarginal vein and apex of marginal vein pigmented;



Figs. 1-7. *Scotolinx* spp. Fig. 1. Female mandible of *S. gallicola* (paralectotype). Fig. 2. Female antenna of *S. gallicola* (paralectotype). Fig. 3. Female mandible of *S. californica* (holotype). Fig. 4. Female antenna of *S. californica* (holotype). Fig. 5. Female hind wing hamuli of *S. californica* (holotype). Fig. 6. Male antenna of *S. californica* (allotype). Fig. 7. Female fore wing of *S. californica* (paratype).

submarginal vein asetose; marginal vein with a dorsomedial line of setae extending vein length; hamular setae long, curved anteriorly, curved portions not opposable (Fig. 5); marginal vein with a line of fine, small setae posterior to hamuli.

Male: 1.29mm long. Similar to the female in habitus, sculpture, and chaetotaxy; differing in that the vertex is dusky and the mesosoma is predominantly metallic green with patterns as follows: pronotum with longitudinal mesal stripe; mesoscutum except anterolateral portion near notaulices; scapula with lateral spot; axilla with 2 pale stripes; metanotum and propodeum metallic dark green. Gaster shining brown. Antenna (Fig. 6) 9 segmented (1,1,2,3,2); funicle segments pedunculate; funicle 1 slightly longer than second or third funicular segments; second and third funicular segments subequal; scape and pedicel with moderately incised striae; remaining segments smooth.

Material examined: 11 females and 24 males from cynipid galls on "stam. fls." of *Quercus agrifolia* Nee collected by P. H. Timberlake at Whittier, Calif. on 17 April 1913, 1 male collected from a window pane by H. C. Compere at Whittier, Calif. on 24 February 1922; 5 males and 4 females collected from *Callirhytis flora* Weld on *Quercus wislizeni* Candolle at Felton, Calif. during 1947 by L. H. Weld; and 4 males and 5 females collected from a cynipid gall on *Quercus* sp. 9 Feb. and 27 Apr. 1893 in Kern County, Calif. by an unknown collector (Bureau of Entomology no. 5524^o). (According to Bureau of Entomology records the latter specimens were probably collected by Coquillett.)

Holotype: Slide-mounted female collected at Felton, Calif., 1947, by L. H. Weld from *C. flora* on *Q. wislizeni* (USNM type no. 73743). Allotype male from the same locality and with the same collection data. Both are deposited in the U.S. National Museum. 22 male and 10 female paratypes are deposited in the Division of Biological Control, University of California, Riverside, 1 male and 1 female paratypes are deposited in the British Museum (Natural History), and the remainder of the paratypical material is in the USNM collection.

Variation: Females from Whittier have the metanotum uniformly pale yellow, the propodeum is pale yellow except the anterior and posteriomedial margins, the gaster is pale on the apex, lateral, and ventral surfaces; some specimens have supernumerary small setae on the mesoscutum, and some specimens have the fore wing nearly hyaline where it is infuscated on the holotype, and some specimens have the infuscation extending nearly half the length of the wing. Some specimens from Kern County have the scutellum mottled, the propodeum may be metallic blue green, or the male can be pale marked behind the propodeal spiracle; the male fore wing can also be hyaline. The hind coxa is sometimes dark reddish brown. Some males from Whittier have the medial pronotal pigmentation not reaching the posterior margin of the pronotum, the scapula has pigmented medial areas, the scutellum is not extensively pigmented lateral to the paired setae, and the meson of the metanotum can be yellow or have a small pigmented spot.

The specific name "*california*" is a noun in apposition and refers to the state of California, the region from which the species has been recovered.

Scotolinx californica compares well with the type-species. Females of *gallicola* have a more truncate mandible (Fig. 1), the funicular segments are shorter, and the club is more compact (Fig. 2). The setae on the head posterior to the compound eye and on the scapula are thicker, dark, and more conspicuous, and the setae on the pronotum are more dense and dark in *gallicola*. Males of *gallicola* have the entire mesoscutum and scutellum dark metallic green. *Scotolinx gallicola* has been recovered from galls on bottle brush in New South Wales, Australia; *S. californica* presumably parasitizes gall-forming cynipids on oak in California.

The fact that the male of *californica* has an extra funicular segment could be taken as grounds for the creation of a new genus. Otherwise the male and female agree with *Scotolinx*. It seems more reasonable

to expand the concept of *Scotolinx* to accommodate the new species than to create a new genus.

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SCIENTIFIC NOTE

New Records of Mayflies (Ephemeroptera) from California and Mexico¹. — A collection of mayflies on loan from the California Academy of Sciences, San Francisco, includes new records of *Ametropus ammophilus* Allen & Edmunds and of *Choroterpes* (*Choroterpes*) *inornata* Eaton.

Ametropus ammophilus was described from northwestern Washington, and is known from western Montana and western Oregon. A collection of nymphs from Upper Truckee River, 0.16 km. downstream from Highway 50 bridge (depth 0.7 meters), El Dorado Co., California 20-XI-69, W. Arthur Noble, constitute a new state record for California. *Choroterpes inornata* was described from northern Sonora, Mexico and Arizona, and specimens of the species have been reported also from southern Colorado and New Mexico. Nymphs of *C. inornata* collected in a stream at Rancho Cuevas Pintas, 9 miles west Loreto, Baja California Sur, Mexico, 18-V-69, S.C. Williams, represent a new record of the species from Baja California and is the only mayfly to be reported from Baja California Sur. — RICHARD K. ALLEN, Department of Biology, California State University, Los Angeles, 90032.

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